SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

2102-F-21-R-41

Name: West 81 Lake **County**: Kingsbury
Legal Description: T109N-R53W-Sec.22-27, 34-36
Location from nearest town: 4 miles south of Arlington, SD

Dates of present survey: August 18-20, 2008
Date last surveyed: August 21-23, 2006

Primary Game and Forage Species	Secondary and Other Species
Walleye	Northern Pike
Yellow Perch	Black Bullhead
Smallmouth Bass	Yellow Bullhead
Largemouth Bass	White Bass
	Muskellunge

PHYSICAL DATA

Surface Area: 1,590 acres **Watershed area**: No data
Maximum depth: No data **Mean depth**: No data
Volume: No data **Shoreline length**: No data
Contour map available: No, shoreline only **Date mapped**: 2000 (SDSU)
Lake elevation observed during the survey: 3 feet low
Beneficial use classifications: fish and wildlife propagation and stock watering

Ownership of Lake and Adjacent Lakeshore Property

The original lake basin for West 81 Lake, known as Brush/Twin Lakes, is listed as meandered public water in the State of South Dakota Listing of Meandered Lakes. The fishery in West 81 Lake is managed by the South Dakota Department of Game, Fish, and Parks (GFP). Part of the western end of the lake lies within a Waterfowl Production Area (WPA) owned and managed by the United States Fish and Wildlife Service (USFWS). The remainder of the shoreline, other than public road right-of-ways, is privately owned.

Fishing Access

There are no boat ramps on West 81 Lake, but boats can be launched off the county road right-of-way on the southwest corner of the lake. Shore fishing access is limited to public road right-of-ways.

Field Observations of Water Quality and Aquatic Vegetation

The water in West 81 Lake was clear with a Secchi depth measurement of 1.78m (70.0 in). Large, dense beds of clasping leaf pondweed (*Potamageton richardsonii*), coontail (*Ceratophyllum demersum*), and sago pondweed (*Potamageton pectinatus*) were found around the entire lake.

BIOLOGICAL DATA

Methods:

West 81 Lake was sampled on August 18-20, 2008 with three overnight gill net sets and ten overnight trap net sets. The trap nets are constructed with 19-mm-bar-mesh (¾ in) netting, 0.9 m high x 1.5 m wide (3 ft high x 5 ft wide) frames and 18.3 m (60 ft) long leads. The gill nets are 45.7 m long x 1.8 m deep (150 ft long x 6 ft deep) with one 7.6 m (25 ft) panel each of 13, 19, 25, 32, 38 and 51-mm-bar-mesh (½, ¾, 1, 1¼, 1½, and 2 in) monofilament netting. Sampling locations are displayed in Figure 4.

Results and Discussion:

Gill Net Catch

Walleye (79.5%) were the most abundant species sampled in the gill nets this year followed by yellow perch, white bass, and northern pike (Table 1).

Table 1. Total catch from three overnight gill net sets at West 81 Lake, Kingsbury County, August 18-20, 2008.

Species	Number	Percent	CPUE[1]	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Walleye	97	79.5	32.3	±16.5	21.0	66	24	88
Yellow Perch	16	13.1	5.3	±6.0	101.4	13	6	119
White Bass	6	4.9	2.0	±2.4	0.9	--	--	--
Northern Pike	3	2.5	1.0	±0.9	3.0	--	--	--

* Four years (2000, 2002, 2004, 2006).

Trap Net Catch

Walleye (28.1%), smallmouth bass (24.6%), black bullhead (21.1%) and yellow perch (21.1%) were the most common species in the trap-net catch along with two northern pike and one black crappie (Table 2). Submerged aquatic vegetation is very abundant along the shorelines of West 81 Lake and likely had a negative impact on trap net catches.

Table 2. Total catch from nine overnight trap net sets at West 81 Lake, Kingsbury County, August 18-20, 2008.

Species	Number	Percent	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Walleye	16	28.1	1.6	±0.7	2.2	81	56	83
Smallmouth Bass	14	24.6	1.4	±0.9	0.05	21	14	118
Black Bullhead	12	21.1	1.2	±0.5	510.7	75	67	100
Yellow Perch	12	21.1	1.2	±0.8	9.5	33	33	101
Northern Pike	2	3.5	0.2	±0.2	0.5	--	--	--
Black Crappie	1	1.8	0.1	±0.1	0.0	--	--	--

* Four years (2000, 2002, 2004, 2006).

[1] See Appendix A for definitions of CPUE, PSD, and mean Wr.

Walleye

Management objective: Maintain a walleye population with a gill-net CPUE of at least 15, a PSD range of 30-60, and a growth rate of 14 inches by age-3.

The West 81 walleye population is currently dominated by naturally-produced, age-1 fish, although fish from ten different year-classes (1-13 years old) were sampled (Table 4). Walleye growth is above regional, statewide and large lake averages with fish exceeding 40 cm (16 inches) before age-3 (Table 4). The high RSD-P value indicates that large fish (> 51 cm or 20 in) comprise a significant percentage (24%) of the population that is at least stock length (25 cm or 10 in) or longer (Figure 1).

Table 3. Walleye gill-net CPUE, PSD, RSD-P, and mean Wr for West 81 Lake, Kingsbury County, 1997-2006.

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Mean*
CPUE		8.5		5.3		5.3		65.0		32.3	21.0
PSD		94		75		20		23		66	53
RSD-P		35		0		30		6		24	18
Mean Wr		96		97		93		95		88	95

*4 years (2000, 2002, 2004, 2006)

Table 4. Weighted mean length at capture (mm) for walleye captured in gill nets in West 81 Lake, Kingsbury County, 2002-2008. Note: sampling was conducted at approximately the same time during each year allowing comparisons among years to monitor growth trends. Sample size is shown in parentheses.

Year	1	2	3	4	5	6	7	8	9	10	11	13
2008	248	412	462	501	530	532	515	--	557	612	--	614
(93)	(48)	(6)	(18)	(3)	(8)	(1)	(1)		(4)	(2)		(2)
2006	344	415	473	457	553	510	605	--	--	--	--	--
(78)	(61)	(2)	(7)	(3)	(1)	(1)	(3)					
2004	294	426	452	490	541	594	642	660	--	--	--	--
(30)	(1)	(1)	(6)	(4)	(10)	(5)	(1)	(2)				
2002	311	404	455	--	509	--	--	--	--	--	--	--
(16)	(3)	(4)	(8)		(1)							

Yellow Perch

Management objective: Maintain a yellow perch population with a gill-net CPUE of at least 50 and a PSD range of 30-60.

Yellow perch gill net CPUE has declined to a 10-year low due to increasing walleye abundance and a lack of consistent natural reproduction (Table 5). No yellow perch have ever been stocked in the lake by GFP.

Table 5. Yellow perch gill-net CPUE, PSD, RSD-P, and mean Wr for West 81 Lake, Kingsbury County, 1999-2008.

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Mean*
CPUE		257.0		74.7		21.3		52.5		5.3	101.4
PSD		57		13		12		--		13	27
RSD-P		2		3		5		--		6	3
Mean Wr		95		101		99		--		119	98

*3 years (2000, 2002, 2004)

Black Bullhead

Only 12 bullheads ranging in length from 17 cm to 42 cm (6.7-16.5 in) in length were sampled this year. High walleye abundance and inefficient trap netting due to abundant vegetation may be responsible for the low catches. Regardless, it is likely that bullhead abundance is generally low in the lake.

All Species

Of the eleven species sampled in West 81 Lake, only four have been stocked by Game, Fish and Parks. Muskellunge were stocked in 2005 and 2006 (Table 7) and although none have been sampled in our surveys, we have reports and photos of fish caught by anglers. Surprisingly, no rough fish have ever been sampled in the lake (Table 6).

Table 6. Gill-net (GN) and trap-net (TN) CPUE for all fish species sampled in West 81 Lake, Kingsbury County, 1999-2008.

Species	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
BLB (GN)		110.5		25.0		--		--		--
BLB (TN)		976.0		1,065.4		0.6		0.7		1.2
YEB (GN)		--		--		--		--		--
YEB (TN)		--		--		3.4		4.3		--
NOP (GN)		5.0		5.7		--		1.0		1.0
NOP (TN)		--		--		1.7		0.2		0.2
WHB (GN)		--		--		--		--		2.0
WHB (TN)		--		--		--		--		--
GSF (GN)		--		--		--		--		--
GSF (TN)		--		--		--		1.7		--
BLG (GN)		--		--		--		--		--
BLG (TN)		--		--		--		0.3		--
SMB (GN)		--		--		--		1.0		--
SMB (TN)		--		--		0.1		0.1		1.4
LMB (GN)		--		--		--		--		--
LMB (TN)		--		--		--		0.7		--
BLC (GN)		--		--		--		--		--
BLC (TN)		--		--		--		--		0.1
YEP (GN)		152.5		74.7		21.3		52.5		5.3
YEP (TN)		32.2		5.7		0.1		--		1.2
WAE (GN)		8.5		5.3		5.3		65.0		32.3
WAE (TN)		--		1.4		3.3		1.4		1.6

BLB (Black Bullhead), YEB (Yellow Bullhead), NOP (Northern Pike), WHB (White Bass), GSF (Green Sunfish), BLG (Bluegill), SMB (Smallmouth Bass), LMB (Largemouth Bass), BLC (Black Crappie), YEP (Yellow Perch), WAE (Walleye)

MANAGEMENT RECOMMENDATIONS

1. Stock walleye fry or fingerlings as needed to accomplish the management objective.

2. Stock yellow perch fry, fingerlings or adults as needed to accomplish the management objective.

3. Accomplish the black bullhead management objective by maintaining walleye abundance and by commercial fishing when fish in the population are large enough and abundant enough to be marketed.

4. Monitor the West 81 fishery by continuing to conduct lake surveys every other year.

5. Explore opportunities to develop boat and shore fishing access.

6. Complete a contour map of the lake. Determine which waters are connected and include connected waters in management activities.

7. Adjust lake survey schedule and sampling techniques to avoid vegetation and more effectively sample the smallmouth bass, largemouth bass and muskellunge populations.

Table 7. Stocking record for West 81 Lake, Kingsbury County, 1999-2008.

Year	Number	Species	Size
1999	2,500,000	Walleye	Fry
2002	1,250,000	Walleye	Fry
2003	20,800	Bluegill	Fingerling
	25,140	Largemouth Bass	Fingerling
	56,900	Smallmouth Bass	Fingerling
	185,900	Walleye	Fingerling
2004	77,055	Largemouth Bass	Fingerling
2005	1,500	Muskellunge	Juvenile
	154,300	Walleye	Fingerling
2006	905	Muskellunge	Juvenile
	139	Smallmouth Bass	Adult

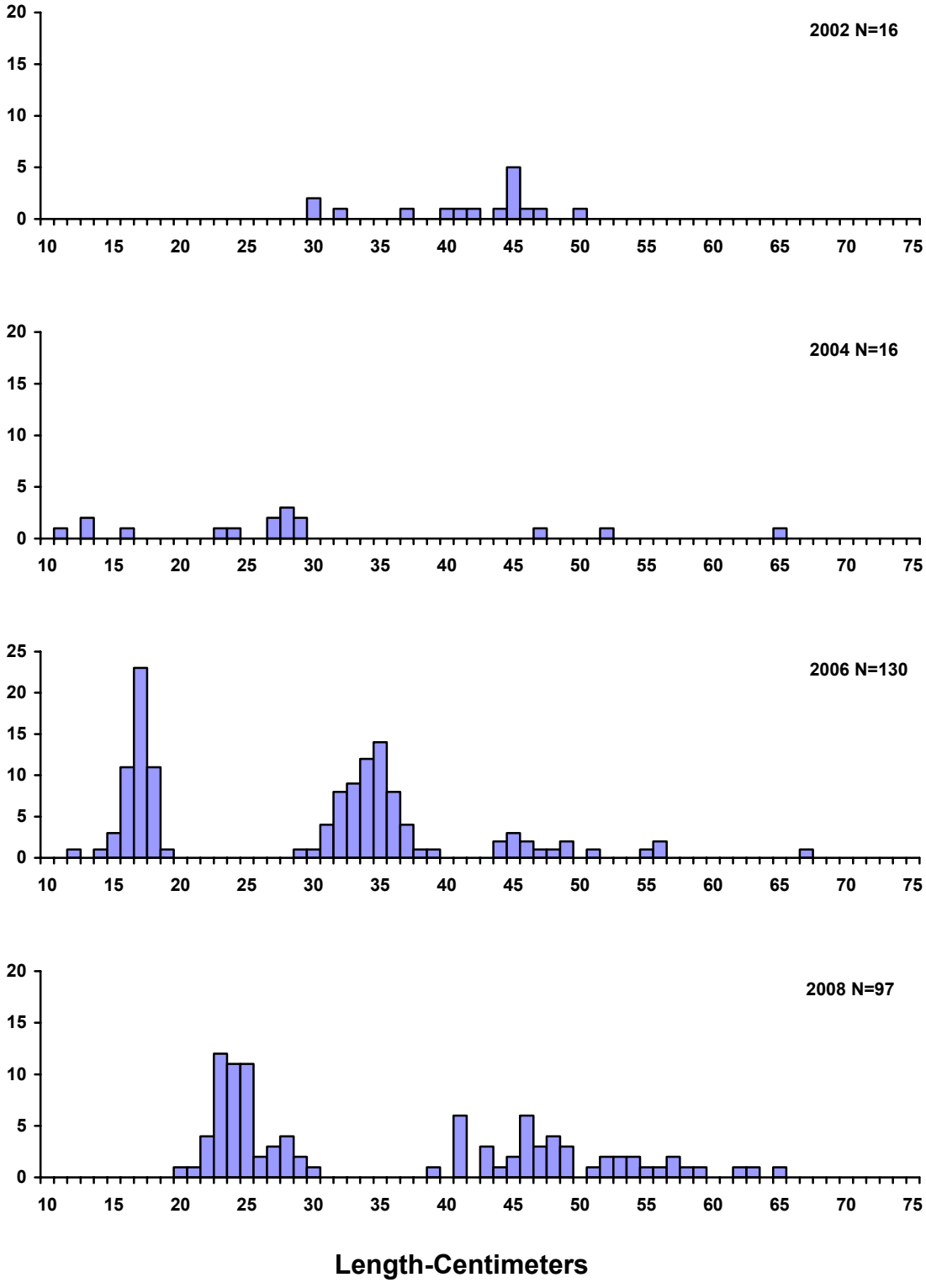


Figure 1. Length frequency histograms for walleye sampled with gill nets in West 81 Lake, Kingsbury County, 2002, 2004, 2006 and 2008.

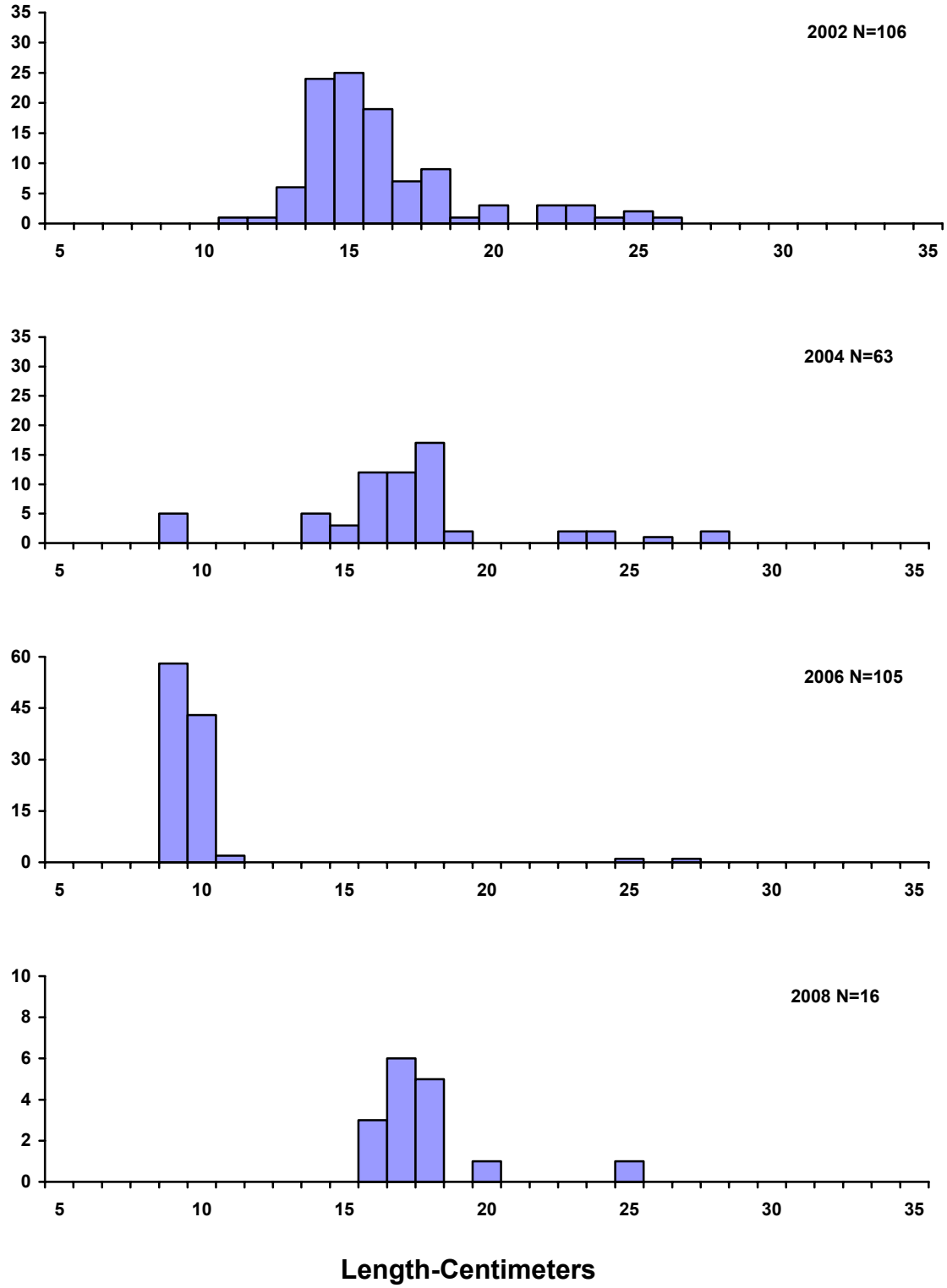


Figure 2. Length frequency histograms for yellow perch sampled with gill nets in West 81 Lake, Kingsbury County, 2002, 2004, 2006 and 2008.

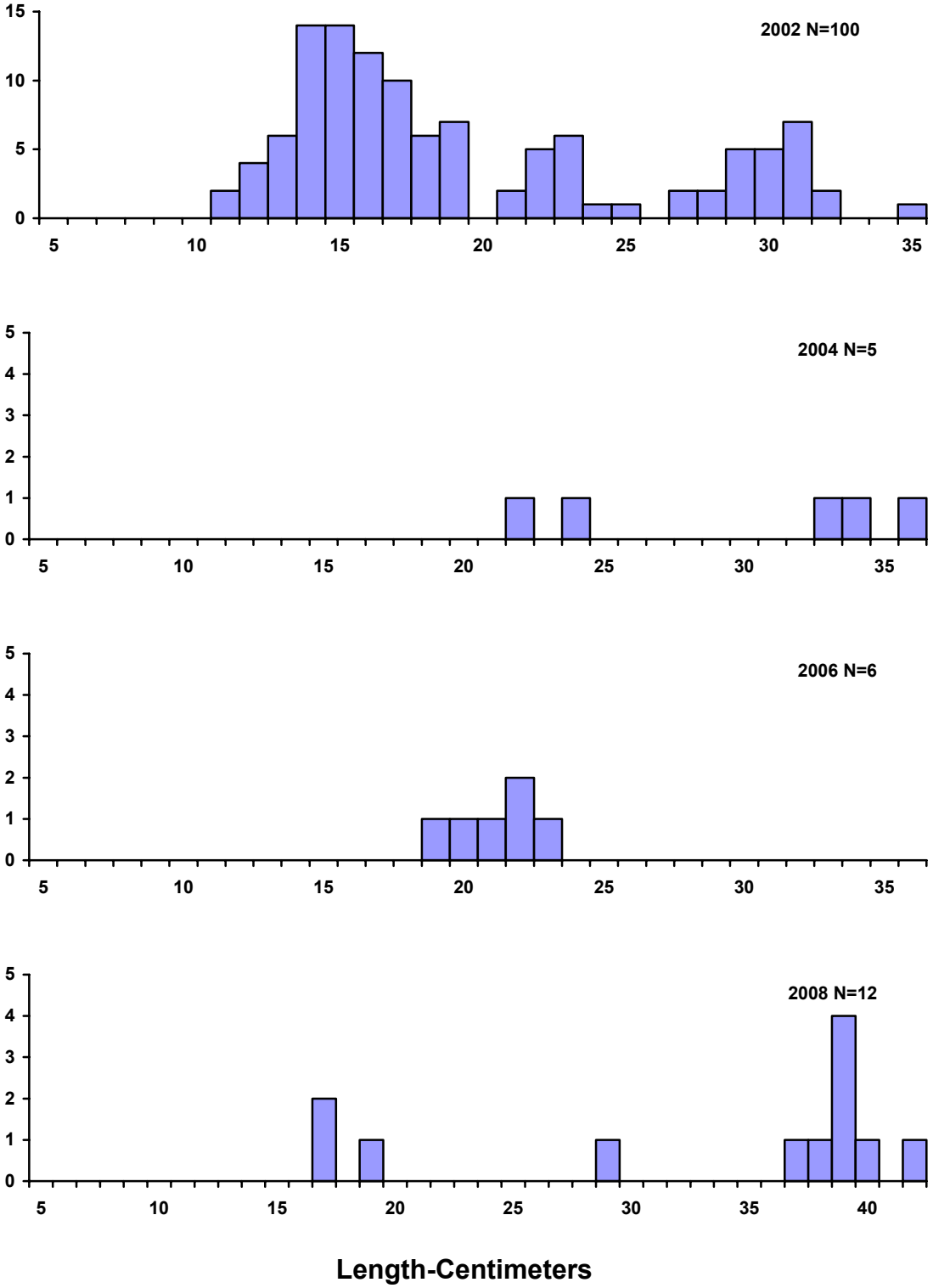
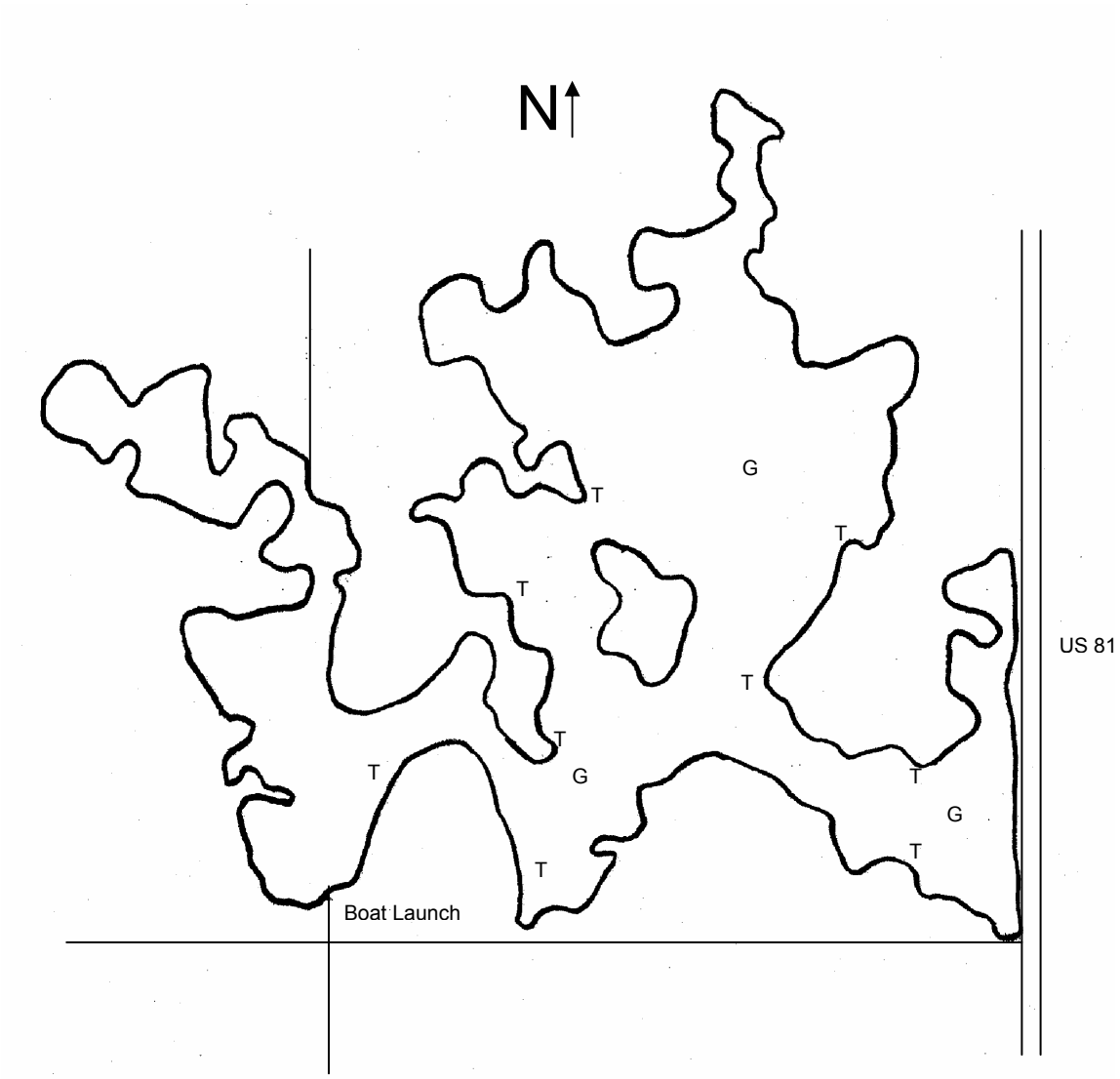


Figure 3. Length frequency histograms for black bullhead sampled with trap nets in West 81 Lake, Kingsbury County, 2002, 2004, 2006 and 2008.



Legend
Gill Nets: G
Trap Nets: T
Electrofishing: E

Figure 4. Sampling locations on West 81 Lake, 2008.

Appendix A. A brief explanation of catch per unit effort (CPUE), proportional stock density (PSD), relative stock density (RSD) and relative weight (Wr).

Catch Per Unit Effort (CPUE) is the catch of animals in numbers or in weight taken by a defined period of effort. Can refer to trap-net nights of effort, gill-net nights of effort, catch per hour of electrofishing, etc.

Proportional Stock Density (PSD) is calculated by the following formula:

$$PSD = \frac{\text{Number of fish} > \text{quality length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

Relative Stock Density (RSD-P) is calculated by the following formula:

$$RSD\text{-}P = \frac{\text{Number of fish} > \text{preferred length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

PSD and RSD-P are unitless and usually calculated to the nearest whole digit.

Size categories for selected species found in Region 3 lake surveys, in centimeters.

Species	Stock	Quality	Preferred	Memorable	Trophy
Walleye	25	38	51	63	76
Sauger	20	30	38	51	63
Yellow perch	13	20	25	30	38
Black crappie	13	20	25	30	38
White crappie	13	20	25	30	38
Bluegill	8	15	20	25	30
Largemouth bass	20	30	38	51	63
Smallmouth bass	18	28	35	43	51
Northern pike	35	53	71	86	112
Channel catfish	28	41	61	71	91
Black bullhead	15	23	30	38	46
Common carp	28	41	53	66	84
Bigmouth buffalo	28	41	53	66	84
Smallmouth buffalo	28	41	53	66	84

For most fish, 30-60 or 40-70 are typical objective ranges for “balanced” populations. Values less than the objective range indicate a population dominated by small fish while values greater than the objective range indicate a population comprised mainly of large fish.

Relative weight (Wr) is a condition index that quantifies fish condition (i.e., how much does a fish weigh for its length). A Wr range of 90-100 is a typical objective for most fish species. When mean Wr values are well below 100 for a size group, problems may exist in food and feeding relationships. When mean Wr values are well above 100 for a size group, fish may not be making the best use of available prey.